

The Fate of the Chesapeake Bay (Dinner Address)

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ABSTRACT

In the 1930's, pollution of Chesapeake Bay was considered to be of limited significance and environmental modification was seldom mentioned, industrial pollutants being limited to areas near Baltimore, Hampton Roads, and Norfolk. It is obvious that environmental problems now are of far greater concern than in 1936; one indicator is the change in abundance of key species of fish and shellfish. Although some conservationists contend the resources of the Bay are depleted, this is not so. But estuarine development has deteriorated, and if allowed to continue, this deterioration could result in the destruction of the Bay's productivity. The Bay must be studied as a single biological system, possibly as a subset of an even larger one including Delaware Bay and the Atlantic waters. All levels of government must be involved in planning, law-making, and resource management and development.

It is always a pleasure for me to participate in a discussion of the Chesapeake Bay. Since I was raised on the Eastern Shore of Maryland, did my academic training at Maryland institutions, and spent a major part of my career in marine biological research and management on the Chesapeake, it is not surprising that I have some rather strong feelings about the future of this magnificent body of water. I want to make it clear in the very beginning that I do not subscribe to the emotional concepts of the "Harbingers of Doom" who believe that it is already too late to preserve the Bay for future generations. Nor can I support the views of some—I hope a limited number—that the Bay is capable of withstanding great alterations and

large amounts of pollutants without substantial changes in its future productivity. I suppose I could be categorized as a conservative moderate who wants to see decisions made involving conflicting uses on the best facts available and with options weighed and evaluated. This talk this evening is subjective since I will attempt to recall my impressions of the Bay as it appeared to me as a young research biologist at the Chesapeake Biological Laboratory in 1936 and my impressions of it some 35 years later in 1972.

Up to 1936 the amount of research that had been carried out on the Chesapeake Bay and its resources was relatively limited except for continuing studies of oysters. Dr. R.V. Truitt at the University of Maryland had been struggling for a number of years to obtain support to establish a marine laboratory and had finally obtained enough funds to build a modest teaching-research laboratory in the early 1930's. Dr. Truitt himself had been carrying out studies on the oyster following after the pioneer works of Dr. Brooks of Johns Hopkins University and Dr. Caswell Graves. Dr. Truitt and his students had also done some research on the blue crab and other limited research projects had been carried out by scientists of the U.S. Bureau of Fisheries and during the twenties by Drs. Cowles and Bramble of The Johns Hopkins University.

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Mr. Wallace was dinner speaker for the Symposium, but his talk was not detailed in pre-conference announcements.

Dr. Truitt was determined to expand studies of the Bay. He formed a group of Maryland Colleges who contributed support to the laboratory. Summer courses for advanced students were developed and outside visiting scientists were encouraged to spend the summer doing research in the areas of their interest.

The main concern about the Bay in the 1930's was depletion of certain fisheries allegedly because of overfishing and creeping pollution from Baltimore Harbor into the Upper Bay. Pollution was considered of limited significance then and environmental modification was hardly ever mentioned except in the case of the Conowingo Dam and its possible adverse affect on anadromous fish such as the shad. It is not surprising that these attitudes prevailed at that time. Most stretches of the shores of the Bay were relatively free of developed communities. Large farms encompassing hundreds of acres and small groups of summer cottages nestled adjacent to the sandy beaches dominated the shoreline. Vast salt marshes stretched for miles along the southern Eastern Shore of Maryland and northern Virginia. Water quality based on coliform measurements indicated a high degree of purity with only limited areas adjacent to a few of the larger cities and towns closed to the taking of shellfish.

Industrial pollution was limited to areas around Norfolk, Hampton Roads, and Baltimore. Since it was confined to very limited stretches of the Bay and its tributaries, such pollution aroused little concern from either conservationists, biologists or the public. Some people complained sufficiently to bring about pollution studies of Baltimore Harbor and the Hampton Roads area, but the overall threat of pollution was considered minimal.

Heated water effluents released to the Bay and its tributaries from power plants were unheard of as a possible pollutant. While a small power plant existed near the headwaters of the Nanticoke River, where striped bass spawn, the only apparent effect of its effluent was to stimulate the stripers to spawn a few weeks earlier in the River

than elsewhere in the Bay. Very few industrial plants of any kind were located along the Bay and its tributaries except in the vicinity of the larger cities.

The C&P Canal was built but little was known about what ecological changes had resulted from its construction. The Baltimore Harbor Channel was dredged regularly and the sludge-muck was dumped in deep water off Kent Island, but this operation seemed to have no effect on fish and shellfish. Silting was changing the Susquehanna flats as a result of farming practices in upstate New York and in Pennsylvania. Some fishermen were predicting that the Conowingo Dam would end the runs of anadromous fish in the Chesapeake, but shad and herring were still relatively abundant.

Other than these few "minor" pressure points, no problems seemed to be significant environmentally. What were considered depleted fisheries held the interest and attention of the States and the public.

In Virginia waters, where extensive private oyster farming was encouraged, the oyster business was thriving and providing employment for thousands. The supply of seed oysters from the James River seed grounds seemed inexhaustible. Every weekday evening from fall until spring, many buy boats were on the James River to take aboard their seed from the tongers. The James River was considered the finest seed oyster grounds in the world and there was little reason to believe this would change. The James River seed, when planted in the lower Bay, produced excellent oysters. This enormous production, coupled with production from public beds yields in Maryland, made the Chesapeake Bay the foremost oyster producing body of water in the world.

Catches of crabs fluctuated widely from year to year. Almost continuously, charges of lack of conservation were hurled back and forth between Maryland and Virginia government officials and watermen. On each occasion, just as the crab catches declined to low levels, a large-year class would come along to replenish the stocks and peace and harmony would be restored again between the brothers—Maryland and Virginia watermen.

Croakers and weakfish could be caught everywhere. Almost anyone could row out a quarter of a mile from shore in a skiff and catch quickly as many of these species as he would need. But all was not rosy in the fishing area. In 1933 and 1934 landings of striped bass—called rockfish by people around the Chesapeake Bay—dropped to the lowest recorded commercial catch in history, even though hundreds of nets of all descriptions were being fished. Many conservationists and sportsmen bemoaned the wanton overfishing allegedly taking place and predicted that this species would become extinct if all commercial fishing was not halted immediately.

In 1935 the Maryland General Assembly, faced with this concern, appropriated \$15,000 to study this fish, looking toward a management program which would save the striped bass. It was at this point I came to be involved with research and management, since I was appointed as the Assistant to Dr. V.D. Vladykov, who was employed to conduct the study.

The shad and herring also had declined drastically and during the late thirties and early forties Federal and State agencies studied the shad, hoping to stem the decline. Overproduction had already declined drastically since the turn of the century in Maryland, and the trend had not been halted in spite of extensive shell planting on the part of the State.

In summary, in 1935 we had a series of contradictions—while some species were depleted, others were at peak abundance, and there appeared to be no correlation between the intensity of fishing and the abundance or scarcity of a given species.

What are the conditions of the environment and the living resources in the Chesapeake Bay some 35 years later? I am unable to give personal appraisal of the Bay since I have not been intimately associated with the Bay and its resources in recent years. However, the proceedings of the Governor's Conference on the Chesapeake Bay in 1968 and some papers in the proceedings of the seminar held in 1970 by the Sports Fishing Institute on the biological significance of es-

tuaries give considerable insight on current levels of production of living organisms, the conflicts in use which exist, and the environmental alterations which have and are taking place.

It is apparent that environmental problems now are of far greater concern than in 1936. In the view of many, these problems are more significant and important than the current status and health of the individual species of living organisms.

Pollution of the tributaries of the Bay has increased greatly compared to 1936. Adverse conditions have resulted from discharges from sewage affecting the biological and chemical qualities of such major tributaries the James and Potomac Rivers. While *coliform* levels are still generally acceptable for shellfish production, some 42,000 acres of shellfish ground are now closed because of domestic sewage pollution and some 250,000 acres are less desirable for finfish because of pollution. Contamination of Bay waters near Baltimore is still a fact of life just as it was in 1935. The threat of oil pollution is a constantly growing one as the demands for this energy source continues to grow and ever-increasing quantities of oil are transported into the Chesapeake area.

Major power plants using Chesapeake water for cooling purposes are now located at several sites and more are under construction or in the offing. The demand for electrical energy is growing at an extraordinary rate. The impact of the heated water on the Bay system is already being given careful study and scrutiny by various Federal and State agencies and other academic and public institutions.

Navigational channel dredging has increased greatly to accommodate to the changing ocean transport methods with major impact on the Chesapeake system—for example, the deepening of the Chesapeake and Delaware Bays. This will affect the fresh water salt balance. The extent of the total impact remains to be seen. Dredging requires the disposal of spoil. In the last 10 years such disposal has become of major importance and concern. Various studies have demonstrated the adverse effects of spoil

deposition on salt marshes, and underwater disposal poses major problems.

The changes in the abundance of key species of fish and shellfish are just as startling in some instances as the changes in the environment. Instead of becoming extinct as was feared by some in 1935, the striped bass is at a peak level of abundance and catch. The commercial landings exceed 8 million pounds as compared to less than 1 million in 1935. Furthermore, over the past 4 years there have been several highly successful dominant year classes which should ensure a high level of abundance for years to come. On the other hand, croakers and weakfish have become so scarce they are of little significance in fin fish production in the Bay.

Oyster production has also changed significantly. While production in Maryland has been maintained by a massive subsidy by the State for public shell planting, seed transplanting, and other cultural practices, the lower Bay has suffered a disastrous decline because of the disease organism *Minchinia nelsonii* (commonly called MSX). This oyster disease in 1959 decimated the stocks of oysters in the lower parts of the Bay, where salinity is high. It still remains virulent and because of it, oyster production is confined to waters of low salinity. Crab abundance still continues to fluctuate widely from year to year, just in the 1930's.

Shellfish production has actually increased because of the development of gear which made it possible to harvest economically the soft clam in the upper Chesapeake below the low tide mark. This species was known to exist in 1935 but no equipment had been developed to extract the clams from the bottom.

While some conservationists still contend the resources of the Bay are depleted, the facts are that the productive capability of the Bay has not been destroyed and if the striped bass was used as an example one could even say it had been enhanced.

The simple facts are that the estuarine environment has deteriorated and if this deterioration is allowed to continue unchecked it could result in the destruction of its basic

productivity. I am sure all of us would like to be able to visualize what will be the condition of the Bay in 2007, another 35 years from now. Will we have allowed pollution to continue to grow? Will we have modified the environment with forethought in such a way as to have destroyed the capability to support living organisms? Will we have dredged the Bay to great depths to accommodate deep draft tankers? Will we have raised substantially the overall temperature of the Bay by permitting unrestricted numbers of power plants to use the Bay waters for cooling purposes?

Or will we have joined together to develop a comprehensive plan for the wise management and use of the Chesapeake Bay and its resources, and having done so, taken all necessary steps at one or another level of government to see that the necessary controls are carried out. I think it is apparent to all of us here, who are leaders in marine science, planning and management, that this is the course we must and will follow. Even now major steps are being taken in this direction. The comprehensive Federal study currently underway with the participation of both States and the academic community could well be the mechanism to do the long-term job. The knowledge base available and potentially available through the 3 major research institutions—Chesapeake Bay Institute of The Johns Hopkins University, Natural Resources Institute of the University of Maryland, and the Institute of Marine Sciences in Virginia—is probably as broad and with as much scientific capability as any other place in the United States. If one adds to this scientific capability the multiple management tools of the States and the determination of the Federal government to participate aggressively in research, planning, management, and enforcement, it is apparent that the components are already acting and reacting to insure the future welfare of the Bay. I am not saying the problems are solved—far from it. Many things must be considered! The Bay must be treated as the single biological entity it is. The moving waters and the fish don't know the boundary line existing between Maryland

and Virginia. Our government and people must also forget about the artificial line in their planning and management. The Bay must be handled as a single system, possibly even as a subset of an even larger system including Delaware Bay and the adjacent Atlantic waters. All levels of Government must be involved and carry out the responsibilities in planning and zoning, laws to control environmental modification, and resource management and development.

It seems to me that a great opportunity exists for the development of a plan and attainment of management of the Chesapeake Bay which could serve as a model for the rest of the country. NOAA is vitally interested in working with and assisting other Federal agencies, the States and local government in developing such a concept so that our children and our children's children will have the same kind of benefits from the Chesapeake as we have been so fortunate to have ourselves.

Symposium Summary

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It's a large order to attempt a summary of a conference, but I suspect I was brought here from 3,000 miles in the hope I would be neutral, impartial, and objective.

It was my understanding that the purpose of this Conference was to bring together the working scientists of the Chesapeake area to discuss the present status of the Chesapeake Bay, to determine what should be done, and apply the collective knowledge to the problems. Management was implicit in this idea, I believe. However, the real management of this area, the Chesapeake Bay and its watershed, does not reside in this conference. The decision makers, who may not always realize it, are the power-and-light people, Bethlehem Steel, the coal diggers of Pennsylvania, and the pesticide spreaders of the Shenandoah. Most of you are here trying to figure out what to do because of what these people

have done. Nevertheless, they must hear the evidence and come to some decision on their own. Perhaps they have been to other meetings (indeed some of them were—one such meeting was held here September 16-18, 1971; see Bergoffin, 1971). Perhaps a lot of them will be back on the 24th of February to attend "The 10th Annual Maryland Asphalt Paving Conference" in this room. The closest to management at this meeting is the State official from Maryland but he also, like the scientists, is trying to catch up with the people who are doing the shaking and moving.

I was reminded of a meeting held about 2 weeks ago on the problems of San Francisco Bay. Today, as at that meeting, I have heard the usual complaint of how little is known and how more research is needed. At the same time we are being reassured that the Chesapeake Bay is not sick yet and things aren't all that bad—there is hope we can still save the environment. A new note creeps in. Everything must be done at once—bring the biologists, geographers, social and physical scientists together and get all possible permutations into a categorized inventory. Feed it into a giant problem solver. The name of this game of expensive problem solving is "Systems Analysis." I presume it will tell us

¹Dr. Hedgpeth was born and educated in California. He received all of his advanced degrees, including his Ph.D., at the University of California at Berkeley in zoology. He is an outstanding specialist in marine ecology and pycnogonids and the author of many papers (in his own words, "environmental polemics"), including "Guide to Seashore Animals of the San Francisco Bay Region." He acts as Head of the Yaquina Biology Laboratory.